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Efficient orthonormality testing for synthesis with pass-transistor selectors

Berkelaar, M.   van Ginneken, L.P.P.P.
Eindhoven Univ. of Technol., Netherlands;

This paper appears in: **Computer-Aided Design, 1995. ICCAD-95. Digest of Technical Papers., 1995 IEEE/ACM International Conference on**

Abstract:
This paper presents the mapping problem for **pass transistor** selector mapping, which has not been addressed before. **Pass transistor synthesis** is potentially important for semi- or full-custom design techniques, which are increasingly attracting attention. **Pass transistors** have the advantage that fewer transistors are needed, and that circuits with high fanin and small delay can be constructed. Technology mapping approaches in the existing literature cannot handle these selectors, due to the restriction of I-hot encoding of the control signals. We present a new algorithm to address this problem, which is based an the novel idea of a general Boolean Oracle. Our oracle is based on ATPG techniques, and compared to BDDs, the oracle has the advantage that failure to complete only affects optimization locally, and does not hinder optimization elsewhere in the logic. A limitation of BDDs is that it is difficult to complete the algorithm if a **BDD** grows too large. The experimental results show up to 82% improvement in transistor count for the MCNC combinatorial multi-level examples

Index Terms:
ATPG techniques   general Boolean Oracle   logic CAD   logic design   logic **synthesis**   logic testing   mapping problem   **pass transistor** selector mapping   transistor circuits   ATPG techniques   general Boolean Oracle   logic CAD   logic design   logic **synthesis**   logic testing   mapping problem   **pass transistor** selector mapping   transistor circuits

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Yano, K.; Sasaki, Y.; Rikino, K.; Seki, K.;
Solid-State Circuits, IEEE Journal of , Volume: 31 , Issue: 6 , June 1996
Pages:792 - 803

[Abstract]   [PDF Full-Text (1380 KB)]   **IEEE JNL**

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2 **Efficient orthonormality testing for synthesis with pass-transistor selectors**
Berkelaar, M.; van Ginneken, L.P.P.P.;
Computer-Aided Design, 1995. ICCAD-95. Digest of Technical Papers., 1995 IEEE/ACM International Conference on , 5-9 Nov. 1995
Pages:256 - 263

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Pedron, C.; Stauffer, A.;
Computer-Aided Design of Integrated Circuits and Systems, IEEE Transactions on , Volume: 7 , Issue: 7 , July 1988
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Circuits and Systems, 1995., Proceedings., Proceedings of the 38th Midwest Symposium on , Volume: 1 , 13-16 Aug. 1995
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Berkelaar, M.; van Ginneken, L.P.P.P.;
Computer-Aided Design, 1995. ICCAD-95. Digest of Technical Papers., 1995 IEEE/ACM International Conference on , 5-9 Nov. 1995
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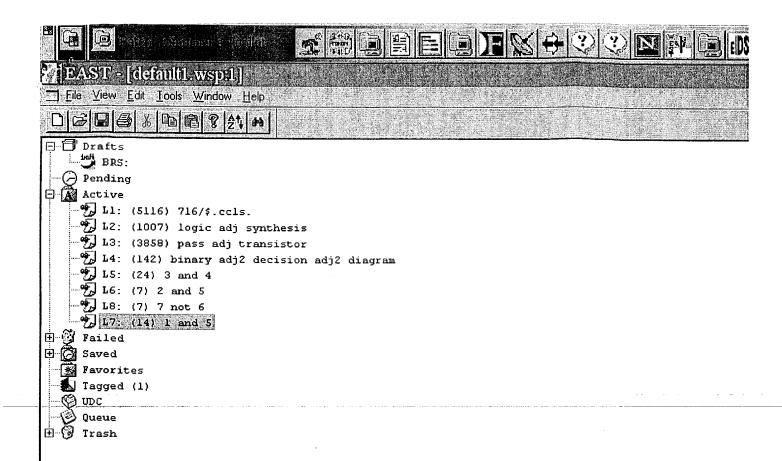[Abstract]   [PDF Full-Text (728 KB)]   **IEEE CNF**

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7	—	—	US 6301692 B1	20011009	65	Method for designing layout of	7